IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of the Claims:

1. (Previously presented) A phased array antenna system with variable electrical tilt and including an array of antenna elements comprising:
   a) a divider for dividing a radio frequency (RF) carrier signal into first and second signals,
   b) a variable phase shifter for introducing a variable relative phase shift between the first and second signals,
   c) a phase to power converter for converting the relatively phase shifted first and second signals into signals whose powers are a function of the relative phase shift,
   d) first and second power splitters for dividing the converted signals into at least two sets of divided signals, the total number of divided signals in the sets being at least equal to the number of antenna elements in the array,
   e) power to phase converters for combining pairs of divided signals from different power splitters to provide vector sum and difference components with appropriate phase for supply to respective pairs of antenna elements located at like distances with respect to an array centre.

2. (Previously presented) A system according to Claim 1 having an odd number of antenna elements comprising a central antenna element located centrally of each pair of like distant antenna elements.

3. (Previously presented) A system according to Claim 2 including a third power splitter connected between the phase to power converter and one of the first and second power splitters and arranged to divert to the central antenna element a proportion of the power from the phase to power converter.

4. (Previously presented) A system according to Claim 1 wherein the phase to power and power to phase converters are combinations of phase shifters and quadrature hybrid couplers.

5. (Previously presented) A system according to Claim 1 wherein the phase to power and power to phase converters are combinations of phase shifters and 180 degree hybrid couplers.

6. (Previously presented) A system according to Claim 1 wherein the divider, phase shifter, phase to power and power to phase converters and power splitters are co-located with the array of antenna elements as an antenna assembly and the assembly has a single RF input power feed from a remote source.

7. (Previously presented) A system according to Claim 1 wherein the divider and phase shifter are located remotely from the phase to power and power to phase converters, the power splitters and the array of antenna elements which are co-located as an antenna assembly, and the assembly has dual RF input power feeds from a remote source.

8. (Previously presented) A system according to Claim 7 wherein the divider and phase shifter are co-located with the remote source for use by an operator in varying angle of electrical tilt.

9. (Previously presented) A system according to Claim 7 including duplexers to combine signals passing from or divide signals passing to different operators which share the antenna system.

10. (Previously presented) A system according to Claim 1 wherein the power splitters are arranged to provide for the antenna elements to receive drive voltages which fall from a maximum centrally of the antenna array to a minimum at array ends.

11. (Previously presented) A system according to Claim 1 wherein one power splitter is arranged to provide a set of voltages which rise from a minimum to a maximum associated with the antenna array centre and its ends respectively, as appropriate to establish a progressive phase front across the antenna array, the phase front being substantially linear as an angle of tilt is increased in a working range of tilt, as required for reasonable boresight gain and side lobe suppression.

12. (Previously presented) A method of providing variable electrical tilt in a phased array antenna system including an array antenna elements wherein the method comprising the steps of:

a) dividing a radio frequency carrier signal into first and second signals,

b) introducing a variable relative phase shift between the first and second signals,

c) converting the relatively phase shifted first and second signals into signals whose powers are a function of the relative phase shift,

d) using power splitters to divide the converted signals into at least two sets of divided signals, the total number of divided signals in the sets being at least equal to the number of antenna elements in the array,

e) combining pairs of divided signals from different power splitters to provide vector sum and difference components with appropriate phase and supplying the components to respective pairs of antenna elements located at like distances with respect to an array centre.

13. (Previously presented) A method according to Claim 12 wherein the antenna array has an odd number of antenna elements comprising a central antenna element located centrally of each pair of like distant antenna elements.

14. (Previously presented) A method according to Claim 13 wherein the phased array antenna system includes a third power splitter connected to receive one of the signals whose power is a function of the relative phase shift and the method includes using such splitter to divert to the central element a proportion of the power in such signal.

15. (Previously presented) A method according to Claim 12 wherein conversion of the relatively phase shifted first and second signals and combining of pairs of divided signals are implemented respectively using phase to power and power to phase converters incorporating 90 or 180 degree hybrid couplers.

16. (Previously presented) A method according to Claim 12 wherein steps a) to e) are implemented using components co-located with the array of antenna elements to form an antenna assembly with input from a single RF input power feed from a remote source.

17. (Previously presented) A method according to Claim 12 wherein steps a) and b) are implemented using components located remotely of the array of antenna elements and steps c) to e) are implemented using components co-located with the array and forming therewith an antenna assembly having dual RF input power feeds from a remote source.

18. (Previously presented) A method according to Claim 17 wherein step b) includes varying the relative phase shift to vary the angle of electrical tilt.

19. (Previously presented) A method according to Claim 17 including combining signals passing from or dividing signals passing to different operators which share the antenna system.

20. (Previously presented) A method according to Claim 12 including providing for the antenna elements to receive drive voltages which fall from a maximum centrally of the antenna array to a minimum at array ends.

21. (Previously presented) A method according to Claim 12 wherein step d) includes providing for one set of divided signals to rise from a minimum to a maximum associated with the antenna array centre and its ends respectively, as appropriate to establish a progressive phase front across the antenna array, the phase front being substantially linear as an angle of tilt is increased in a working range of tilt, as required for reasonable boresight gain and side lobe suppression.

22. (Previously presented) A method according to Claim 13 wherein:

a) the variable phase shift is a first variable phase shift introduced in a transmit path,

b) the method includes introducing a second variable phase shift in a receive path,

c) the antenna system is operative in one direction in transmit mode and in a reverse direction in receive mode, and

d) the method includes adjusting the antenna system's angles of electrical tilt in transmit and receive modes independently by adjusting the first and second variable phase shifts respectively.

23. (Previously presented) A system according to Claim 1 wherein:

a) the variable phase shifter is a first variable phase shifter associated with first filtering means defining a transmit path,

b) the system includes a second variable phase shifter associated with second filtering means defining a receive path,

c) the system also includes elements operative in one direction in transmit mode and in a reverse direction in receive mode, and

d) the system's angles of electrical tilt in transmit and receive modes are independently adjustable by means of the first and second variable phase shifters respectively.